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TO PROFESSOR SHŌITIRŌ HAYAMI

Shotaro Hayami

IN HONOR OF PROFESSOR SHŌITIRŌ HAYAMI

Dr. Shōitirō Hayami, the former Professor of Oceanography at the Geophysical Institute, Kyoto University, retired from the University after a long service as Professor and as administrative leader, at the end of March, 1966. On the occasion of his retirement, we honor him by this issue of the Special Contributions.

Professor Hayami was born on March 5, 1903 in Osaka. After graduation from Momoyama Middle School and the Third High School, he entered Kyoto University in 1924, in the Faculty of Science, majoring in Geophysics. His resolution in selecting geophysics as his major subject was made after he struggled, in his young age, as to which way of approach to choose, medicine, philosophy, or natural philosophy, for the understanding of the existence of human beings. The answer of his approach was, forty years later, expressed in a poem, "Speculative Science of the Earth" published in *Geophysical Papers Dedicated to Professor Kenzo Sassa* in 1963 :

.....

Mankind is the incarnation of a peculiar balance of the Earth,
And evolves perpetually from the bosom of the divine Earth.
What catalyzes such a balance ?
Love ! so it is.
What is Love ?
Ah ! so many words have been spent on Love.
To me, Love is tolerance,
Love is endurance.
To the humble minds that endure pains and tears,
Generously open is the Divine Gate.
They alone will survive the terrible age of tellurian stress,
And will create on the Earth a new paradise.

He graduated from the University in 1927. Under the late Professor Emeritus Toshi Shida, he wrote a graduation thesis which was based on his measurement of temperature distributions in many hot spring wells while he spent a while at the University Geophysical Research Station in Beppu, which was under construction at that time. He found that the temperature at the ground surface had a large variety even though the temperature at the bottom was the same, and his study contributed fundamentals to later studies on temperature distribution in hot springs.

After graduation, he studied at the graduate school of the same institution under Professor Shida. He was appointed lecturer in 1928, and gave a lecture on general geophysics.

When the Shanghai Science Institute was established in Shanghai, based on

the Chino-Japanese Cultural Treaty in 1931, he moved there as a research member of the Institute, and was thereafter engaged in research on geophysics in the Chinese Continent for sixteen years. One of his very wide research activities in this period, was his observation of geomagnetic change at the time of a total solar eclipse at Losop Atoll. He caught for the first time a change in geomagnetic field in low latitude by a solar eclipse, and this study introduced many observations of geomagnetic changes at solar eclipses by other investigators.

During his stay in China, his endeavor was especially concentrated to geophysical studies on rivers. His study highly contributed to river hydrology which was emerging in the world at that time. To mention a few examples of his research during this period, he established a theory of suspension of suspended materials in river water, extensively examined bottom sediments of the Yangtze River, explained their size distribution by his theory of suspension, and discussed the stability of the Yangtze River bed. Also, he analyzed long term changes in the river stage of the Yangtze River, and presented important basic materials of climatic variation in the Yangtze Valley. He was awarded Doctor of Science degree from Kyoto University by the "Hydrological Studies on the Yangtze River" in 1942, and also received the fifth Tairiku (Continent) Prize from the Shanghai Tairiku Press. While he was staying in China he was very much intersted in Chinese culture, especially in a close relation between Chinese culture and her natural background.

After World War II, in 1947, he returned to Kyoto University as Associate Professor of Oceanography, and made efforts for the reestablishment of the Oceanographical Laboratory after the late Professor Emeritus Takaharu Nomitsu. He advanced active researches on oceanogrphy under severe circumstances after the War, training many researchers in physical oceanography. During this period of four years, he made many original studies such as the filling up of harbors by drift sand and beach erosion.

Since our country, Japan, was much damaged by severe natural disasters during several years after the War, the Disaster Prevention Research Institute was established at Kyoto University in 1951, and from that time on he engaged in geophysical reserches of naturl disasters. His researches on natural disasters widely ranged. Highly renowned among these were the theoretical study on flood flow by the introduction of horizontal mixing, development of analogue computer for flood routing as an application of the theory, and analysis of the run-off by rainfall ; they all became a remarkable contribution to hydrology. His work which elucidated the relation between types of breaking waves and beach erosin was also noted. He also performed a deep study of ground subsidence by pumping up of the ground waters, in which he combined soil mechanics and underground hydrology to develop a new field of geohydrology. He later brought attention to the fact that the tidal loading plays a significant role in ground subsidence.

In 1956, Professor Hayami was appointed as Professor of Oceanography at the Geophysical Institute, Faculty of Science, Kyoto University, and thereafter his efforts were concentrated on basic researches in physical oceanography. His research field widely ranged. He began to study on wind waves by the use of a wind flume with Dr. H. Kunishi. He established an oceanographic research tower station off Shirahama, Wakayama Pref. in 1961. This is the first oceanographic research tower station in Japan, by which studies on the air-sea interaction and coastal oceanography have actively been advanced. He developed, with Dr. Y. Fukuo, a method for the precise determination of sea-water density, and a new method of water mass analysis of coastal water by a combination of the density and chlorinity. He originated, with Dr. H. Higuchi, large scale hydraulic model experiments involving tidal current. He began a study on production of sea-salt paticles as a factor in the air-sea interaction with Dr. Y. Toba. Study on two-layer hydraulics, study on evaporation from wavy water surface with Dr. S. Okuda····, these altogether opened new branches in recent oceanographic studies in Japan.

In 1956, he revisited New China after the lapse of ten years, renewed his old friendships in Old China, and resumed his interest in the object of his past research. Stimulated by the severe flood of 1954 of the Yangtze River, he succeeded the late Professor Shida's old work on climatic variation in Eastern Asia during the past one thousand years, which was based on tree rings of a cypress at Mt. Ari-san, reexamined the rate of growth of a Formosan cypress together with meteorological data available in the North Pacific region, and grasped the facts of climatic variation in this region with Dr. M. Outi. Further, he pursued a relation between Indian monsoon and the climatic change, and suggested that the condition of the warm anticyclone over Tibetan Plateau in summer may be the origin of the climatic change. This study will provide an important basis for studies of climatic variation. Also, he obtained a clue for the understanding of meandering of Kuroshio in relation to the climatic variation.

Besides his great activity in original researches, and in devoted training of his successors, Professor Hayami was engaged in many administrative works. Mentioning official posts he held, they included, at the University, Dean of the Faculty of Science (1963—1965), Director of the Disaster Prevention Research Institute (1953—1955, 1965—1966), Director of the Aso Volcanological Laboratory and the Geophysical Research Station in Beppu (1958--1963, 1964—1966). Outside of the University, he has been serving as Vice President of the Oceanographical Society of Japan for many years. He originated Section of Coastal Oceanography in the Society, and served as Chairman of the Section. Also, he has been a Member of Geodetic Council (1965—), and has recently been elected as a Member of Science Council of Japan (1966—).

Professor Hayami is an extremely warm-hearted man with enthusiasm for things scientific and humanistic, and a man of deep insight, excellent conception

and creation. One day, he mentioned the delight of creation, and said that he was the utmost hedonist in the sense that he was engaged in the creation of science. He is thus respected and loved by all his students and colleagues. His devoted training of students is blooming as seen in the papers included in this volume.

He retired, under the age limit, on March 31, 1966 from Kyoto University. Fortunately for us, however, he took a position as Dean, Faculty of Marine Engineering and Science, Tokai University effective April 1, 1966, to further cultivate oceanography and oceanographers in Japan. We pray that his healthy, productive life will continue for many years.

HIDEAKI KUNISHI

November, 1966

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